SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report for Proposed Amended Rule 2202 – On-Road Motor Vehicle Mitigation Options

July 15, 2003

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LIST OF ACRONYMS AND ABBREVIATIONS

AQIP	Air Quality Investment Program
AQMD	South Coast Air Quality Management District
AQMP	Air Quality Management Plan
ASC	Area Source Credits
AVR	Average Vehicle Ridership
CARB (or ARB)	California Air Resources Board
CO	Carbon Monoxide
ECRP	Employee Commute Reduction Program
EMFAC	EMission FACtor mobile source computer model
ERC	Emission Reduction Credits
ERS	Emission Reduction Strategy
MSERC	Mobile Source Emission Reduction Credit
NOx	Nitrogen Oxides
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
STERC	Short Term Emission Reduction Credit
VOC	Volatile Organic Compound

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EXECUTIVE SUMMARY

The South Coast Air Quality Management District (AQMD) is proposing amendments to Rule 2202 - On-Road Motor Vehicle Mitigation Options and its accompanying guideline documents. The rule amendments will update the emission factors to be consistent with the EMFAC 2002 emission model as adopted by the California Air Resources Board and currently applied methodologies for emission reductions from mobile sources. The rule emission tables will be removed from the rule and maintained in the Implementation Guidelines to facilitate future updates. The Employee Commute Reduction Program (ECRP), in the rule exemption section, is proposed to require employers to meet the average vehicle ridership (AVR) performance requirement. Inter-pollutant crediting language has been added that will allow the use of NOx and VOC emission credits in lieu of all or part of a worksite's CO emission reduction target. Proposed rule amendments also include clarification of definitions, addition of a federal field agent definition, and deletion of outdated language. This proposal is designed to provide additional compliance flexibility while facilitating ozone attainment progress for the South Coast Air Basin (SCAB).

The proposed Rule 2202 Implementation Guideline amendments would clarify that emission credits generated are subject to rules, policies or AQMD approved quantification methodologies. The proposed Rule 2202 ECRP Guideline amendments call for streamlined plan submittal requirements, deletion of outdated language, and language clarification.

Staff is further proposing that the Governing Board allow the Executive Officer to periodically review and amend both the Rule 2202 Implementation and ECRP Guidelines in the future, consistent with adopted policies and procedures authorized by Rule 2202. Under this proposal, changes in the guidelines would not be made without appropriate notification and consultation with rule stakeholders and the AQMD Mobile Source Committee.

BACKGROUND

On December 8, 1995, in response to state legislation prohibiting the mandatory submittal of trip reduction plans, the AQMD Governing Board adopted Rule 2202 as a replacement rule that did not mandate trip reduction plan submittals, yet allowed the AQMD to remain in compliance with federal and state Clean Air Act requirements. The rule has provided members of the regulated community with a menu of flexible and cost effective emission reduction options from which they can choose to implement and meet the emission reduction targets for their sites. Rule 2202 continues to allow affected employers the option of implementing a traditional trip reduction program as a means to comply with the rule.

REGULATORY HISTORY

Rule 2202 has been amended several times and replaced Rules 1501 - Work Trip Reduction Plans and 1501.1 - Alternatives to Work Trip Reduction Plans. In 1987, Regulation XV was adopted which required trip reduction plans for employers with 100 or more employees. Rule 1501 was amended in 1993 and Rule 1510.1 was adopted in 1995, to comply with federal and state requirements for extreme non-attainment areas. In 1995, Rule 2202 was adopted to respond to state legislation prohibiting mandatory trip reduction plans. Rule 2202 provided worksites of 100 or more employees a menu of emission reduction options to meet an emission reduction target for their worksite. Compliance strategies included mobile source credits from old-vehicle scrapping, clean on-road and off-road equipment, the use of remote sensing to identify and repair of gross polluting vehicles, and emission reduction credits from stationary sources. Worksites could also earn credits for the use of alternative fuel vehicles, reduction of vehicle miles traveled, and other trip reduction strategies.

In March 1996, Rule 2202 was amended to exempt school districts from complying due to financial hardship. The passage of SB836 directed SCAQMD to raise the employee threshold level from 100 to 250 employees, while SB432 permanently exempted worksites with fewer than 250 employees from complying with the rule. In November 1996, the sunset provision of Rule 2202 was modified to have the rule phase out by June 2001. In October 1998, Rule 2202 was re-modified back to its original sunset provision, i.e., the rule would be rescinded at an unspecified future time when an equivalent level of emissions reductions is produced. In January 2002, several administrative changes to Rule 2202 were passed that included the elimination of alternative fuel vehicle credits except for zero emission vehicles, deleted the remote sensing strategy option due to the implementation of the Inspection and Maintenance Program (Smog Check II), and the addition of a police/sheriff employee category.

PROPOSED AMENDMENTS

Proposed Rule Amendments:

The proposed amendments to the rule include updates or clarifications to the current rule language. Since the last amendment to the rule, other related rules and programs within the AQMD have been amended. To be consistent with current AQMD policies and programs and rule requirements, rule language being proposed is consistent with changes to Regulation XVI - Mobile Source Offset Programs and Regulation XXV - Intercredit Trading, and new definitions for emission reduction credits and area source credits have been added. The rule language has also been expanded to clarify the inclusions of area source credits (ASC) and short term emission reduction credits (STERC) that may also be used to comply with the rule and to meet an added average vehicle ridership performance requirement.

Emission Factors

The rule's employee emission factors and default emission factors are based on the California Air Resources Board (CARB) approved EMFAC model. CARB developed the EMFAC model to calculate emission rates from all motor vehicles, such as passenger cars and trucks, which operate on the roads in California. In the EMFAC 2002 model, emission rates and vehicle activity data are used to calculate regional emission inventories. Over time, the number and types of vehicles, and other factors, such as inventory methodology improvements necessitate regular changes to the emission model. A detailed discussion of methodology used to develop the emission factors is provided in the Technical Appendix attached to this report. The rule amendments update the emission factor tables to the current version of the EMFAC 2002 emission model. This will change the equivalent emission reduction determination to be consistent with the draft final 2003 AQMP in calculating emissions from on-road mobile sources. To facilitate future updates to the rule's emission factors, the employee emission factors and the default emission factors will be referenced in the Implementation Guidelines.

Air Quality Investment Program

The updated emission factors will affect the current Air Quality Investment Program's (AQIP) calculated emission reduction targets that the AQMD will need to meet. An employer may participate in the AQIP by paying an in lieu fee for either a one or a three year term. For those employers participating, they are considered to be in compliance with the rule for the corresponding time period. The AQMD then uses the collected monies to purchase emission reduction credits or fund programs that will result in emission reductions that will meet the emission reduction target for those participating employer's worksites. The programs funded by the AQIP include such sources as old-

vehicle scrapping, re-powering marine vessels, alternative fuel vehicles, emission reduction credits (ERCs), and construction equipment. As such, emission reduction credits are derived from a variety of sources and the calculation of credits are based upon methods that may not be based on the EMFAC model.

Although the emission reductions credits generated are calculated using AQMD and CARB Board approved policies and protocols, there is not a direct one to one relationship between the emission reduction calculation methods for AQIP projects and the calculated emission reduction targets. Because of the various credit sources it would be difficult to link the impact on AQIP directly in terms of how the EMFAC 2002 model and the proposed emission factors are applied. Currently, on average, the cost effectiveness of the AQIP funded projects is $2,940 per total ton of emissions reduced (i.e., VOC, NOx and one-seventh of CO combined). Based on the AQIP $60 per employee cost to an employer would result in a cost effectiveness of $8,340 per total ton for 2004. The AQIP has been very effective in funding projects that go beyond meeting the required emission reduction target. The AQMD staff has evaluated the available AQIP emission reductions achieved and the fees collected and have determined that they will be able to meet the AQIP emission reduction targets based on EMFAC 2002 without increasing the AQIP fee.

Over time the AQIP has grown from 113 employers participating in 2000 to over 280 employers in 2002. To obtain the emission credits to offset the employer's commute trips, proposals are solicited and evaluated by AQMD staff. For the first three quarters of 2002, 47 proposals were received, while in 2000, 26 proposals were received. Each proposal is evaluated and scored by a panel of reviewers composed of AQMD staff. The proposals approved for funding by the Governing Board then required ongoing contract management by staff. Because of the increased levels of staff time for the AQIP it is proposed that up to 5% of the average annual funding received be used to cover the cost of program administration. These expenses are not currently covered by the AQIP. Staff evaluated the potential effect on the AQIP to obtain the equivalent emission reductions and has found that 5% administrative cost would not impair the ability of the AQIP to secure equivalent emission reductions or better or have an adverse effect based on the current and anticipated cost effectiveness of proposals submitted by the AQIP credit providers.

Inter-Pollutant Crediting

The proposed rule amendments include the availability of inter-pollutant crediting to facilitate worksites in meeting their calculated CO emission reduction targets and to expand flexibility for rule compliance. The South Coast Air Basin is expected to stay in attainment for CO, however, reaching ozone attainment is a work in progress. Of the pollutants that are regulated by Rule 2202, VOC and NOx are ozone precursors. To

facilitate the AQMD's progress toward attaining the ozone standards, staff is proposing that any person may apply one pound of VOC credit to be equivalent to ten pounds of CO or one pound NOx to be equivalent to six pounds of CO. Inter-pollutant crediting is not to be used for CO banking and does not allow for CO crediting back to VOC or NOx. A discussion of the methodology used to develop inter-pollutant crediting ratios is provided in the Technical Appendix attached to this report.

The inter-pollutant crediting ratio is based on on-road VOC and NOx emissions relative to CO emissions. Using inter-pollutant crediting, an employer may use VOC, NOx or a combination of either emission credits in lieu of all or part of the worksite's required CO emission reduction target. A worksite using inter-pollutant crediting would be considered in CO compliance for that portion of the emission reduction which inter-pollutant crediting was applied. As a result, the emission credit records will show that additional NOx and VOC reductions were achieved, but not the equivalent CO reductions.

Potential emission credit sources include AQMD regulations that incorporate pilot credit generation program rules that authorize the issuance of emission credits prospectively. Emission credits that are issued prospectively are done in advance of the anticipated emission reductions and are reconciled or validated at the end of a reporting period. The prospective credits are usually reconciled either quarterly or annually. To avoid potentially compromising AQMD's CO attainment status, staff is proposing that only reconciled or concurrent emission reduction credits be allowed for use in inter-pollutant crediting.

The goal of establishing an inter-pollutant crediting ratio for the purposes of Rule 2202 compliance is to incentivize and expedite additional VOC and NOx reductions without compromising CO attainment status. Staff will continue to evaluate and verify the inter-pollutant crediting process such that the air quality benefits are maximized.

ECRP Performance Requirement

Under current rule language employers who wish to implement a traditional rideshare program could do so through an exemption. To satisfy the exemption requirement, employers would implement a program that would conform to the Employee Commute Reduction Program (ECRP) Guidelines. The exemption required implementing a program that would be reasonably likely to result in achieving an average vehicle ridership (AVR) goal within three years, equivalent to a basin wide AVR of 1.5. The AVR, as determined by employer surveys, is used to measure success of an ECRP. This is also known as the "good faith effort" to achieve an AVR target. In 1995 the AVR for all employers implementing an ECRP was 1.29 and had risen by 3.7% to 1.34 in 2002.

Section 182(d)(1)(B) of the 1987 Federal Clean Air Act (CAA) required that non-attainment regions implement a program that would require employers of 100 or more employees to reduce work related trips and miles traveled by employees commuting to work to a level 25% above the region's baseline AVR in 1992. At that time the AVR targets were established for regions within the AQMD such that the federally mandated goals could be achieved. As a result the Performance Target Zones for regions 1, 2, and 3 are the AVRs 1.75, 1.5, and 1.3 respectively (a Performance Target Zone map can be found in Rule 2202 Attachment I). This was determined to be the most effective approach in achieving the emission reduction goals. Subsequent amendments to the CAA removed work related trip mandate but allowed emission equivalency as an option for compliance. This re-established the AQMD commitment at an AVR of 1.52. This AVR represents the 25% above the region's 1992 baseline and accounts for additional trip reductions that should have resulted from all employers with 100 or more employees. The CAA allows the substitution of alternative measures that will meet the equivalent emission reductions. The current overall Rule 2202 AVR achieved is approximately 1.36, averaging between the various compliance options. This would resulted in an emission reduction shortfall in 2010 of 0.31, 0.31, and 3.29 tons per day of VOC, NOx, and CO, respectively, which would need to be mitigated through other AQMP measures. However in light of a significant amount of long-term reductions included in the draft final 2003 AQMP, it remains necessary to maximize the emission reduction potential for Rule 2202. To date approximately 24% of the 761 ECRP worksites have achieved an overall 1.5 AVR.

Therefore, staff is proposing that the "good faith effort" measure of program achievement be eliminated and instead employers choosing to implement an ECRP be required to meet a performance requirement. Employers must submit an ECRP annually that will meet an AVR, based on the worksite's geographic location (see rule Attachment I - Performance Zone Map). The AVR may be met either through an ECRP or a combination of an ECRP and any of the emission reduction strategies listed in the Rule.

Other Amendments

Rule 2202 program administration is also being amended to facilitate the future updating of the rule guidelines. The Executive Officer will be authorized to periodically review and update the Rule's Implementation Guidelines and Employee Commute Reduction Program (ECRP) Guidelines. The guideline updates will be done in consultation with the regulated community and the AQMD Mobile Source Committee.

Implementation Dates

For many companies a change from a "good faith effort" to a performance requirement will necessitate rethinking of how their current ECRP could be revamped to meet an

AVR requirement. Staff is proposing that the AVR performance requirement become effective January 1, 2005. Beginning in January 1, 2004 triennial plan and annual analysis will no longer be required instead the annual ECRP submittal will be implemented. All triennial plans with permanent due dates prior to January 1, 2004 would remain in effect to their next triennial due date at which time the AVR performance requirement would apply if post January 1, 2005. The implementation dates will give employers one to two years to thoroughly review the amended implementation options. For example triennial plans with a permanent due date in 2003 will remain in effect until 2006, at which time the AVR performance requirement through the annual ECRP submittal becomes applicable to that plan.

Summary of Proposed Rule Amendments:

- Implementation of amended rule effective January 1, 2004 with ECRP performance requirements beginning January 1, 2005.
- Add definitions: short term emission reduction credit (STERC), area source credit (ASC), reclaim trading credit (RTC), inter-pollutant crediting, federal field agents, and volunteer.
- Clarify the inclusion of other potential emission reduction credit sources such as STERCs based on Rule 1309, and ASCs, MSERCs and RTCs from pilot credit generation rule programs.
- Allow the use of inter-pollutant crediting of VOC and NOx to be applied toward meeting a worksite's CO emission reduction target.
- Performance requirement for employers submitting under ECRP option, effective January 1, 2005.
- To facilitate future updates to the rule emission factors, the employee emission factors and default emission factors will be referenced in the Implementation Guidelines.
- Authorize the Executive Officer to charge 5% administrative cost under the AQIP.
- Authorize the Executive Officer to periodically review and update the Implementation Guidelines and ECRP Guidelines in consultation with rule stakeholders and the AQMD Mobile Source Committee.

Proposed Rule Implementation Guideline Amendments:

The proposed Implementation Guidelines amendments include language that clarifies the inclusion of other potential emission reduction credits or programs. Because of recently adopted or amended rules within Regulation XVI - Mobile Source Offset Program and Regulation XXV - Intercredit Trading additional language was added to show the relationship to Rule 2202. Additional language was added to explain the minimum program requirements to use short term emission reduction credits (STERC) and area source credits (ASC) in the Rule 2202 program. Allowing only the use of STERC rather

than all ERCs will prevent long term emission credit streams from being tied up in Rule 2202, potentially adversely affecting the New Source Review program. When STERCs are transferred they will be subject to an environmental benefit discount of 10% to be consistent with how ERC are administered in the New Source Review program. Other administrative language amendments specify the process by which AQMD notifies employers in the instances of change of ownership and relocations.

Regulation XVI and XXV include pilot credit generation program rules that authorize the generation of only one pollutant such as NOx for the purpose of RECLAIM programs. However, for Rule 2202 compliance pilot credit generation projects not designated for RECLAIM program use may generate current emission reductions (e.g., VOC and CO), that are not authorized in that rule program. Those additional pollutants may be applied toward a worksite's emission reduction target through an application process discussed in more detail in the Implementation Guidelines section titled *Other Emission Reduction Strategies*.

Upon rule adoption persons choosing to use RTCs from pilot credit generation program rules must specify in their application the RTC cycle and the amounts of RTCs to be generated. The emission reductions may be held in an undesignated account as MSERCs until they are sold or transferred. The applicant may convert these MSERCs to RTCs before the credit expires. Once the MSERC has been converted to RTCs they are no longer available for use in Rule 2202 and shall remain in the RECLAIM program. Alternatively the credits may be used for Rule 2202 emission reduction target (ERT) compliance, in which case they will no longer be available for conversion to RTCs.

Emission Factor Updates

The guideline amendments update the emission factor tables to the current CARB adopted EMFAC version 2.2 date April 23, 2003. The emission factors also incorporate a revised commute trip length as published in the Southern California Association of Governments' (SCAG) 1999 State of the Commute. These amendments will result in consistency with the draft final 2003 AQMP in calculating emissions from on-road mobile sources. Staff is proposing that the rule's emission factors, the employee emission factors and the default emission factors, be maintained in the Implementation Guidelines.

Emission Reduction Strategies

Rule 2202 offers employers the opportunity to obtain surplus emission reductions from the implementation of approved alternative emission reduction strategies not regulated by AQMD rules or regulations. The proposed guideline language allows any person to submit an application to generate emission reduction credits for the purposes of Rule 2202 compliance. The resulting credits may be applied toward meeting a worksite's

emission reduction target or can be traded and/or sold to others within the Rule 2202 program. These emission reduction credits are not intended for use in any other AQMD program or rule. The Guidelines provide the procedures for submitting an application and the conditions for the alternative strategy.

Guideline Amendments

Staff is further proposing that the Governing Board authorize the Executive Officer to amend Rule 2202 Guidelines in the future, consistent with adopted policies and procedures authorized by Rule 2202. Under this proposal the Executive Office will review the Implementation Guidelines periodically and make necessary amendments. Staff is proposing that the changes in the guidelines would not be made without appropriate notification and consultation with rule stakeholders and the AQMD Mobile Source Committee.

Summary of Proposed Implementation Guideline Amendments

- Add language that clarifies the inclusion of other potential emission reduction credits sources such as ASCs.
- Program administration of Short Term Emission Reduction Credits (STERCs), Area Source Credits (ASCs) and other emission reduction strategies.
- Add language that allows the use of RTCs generated from pilot credit rule programs.
- Add language to allow the use of inter-pollutant crediting.
- Update emission factors and assumptions, using EMFAC 2002.
- Periodic review and update of guidelines in consultation with rule stakeholders and the AQMD Mobile Source Committee.

Proposed Employee Commute Reduction Program (ECRP) Guideline Amendments:

The Employee Commute Reduction Program (ECRP) requires employers to submit a plan that supports the implementation of this option. The ECRP Guidelines provide the basis for the implementation of this rule option. Staff recognizes the effort required to implement an ECRP and is proposing amendments to the guidelines to assist employers' implementation of this rule option.

The proposed amendments reduce the amount of training hours required for the employee transportation coordinator. The employee transportation coordinator (ETC) is a person who has attended an AQMD certified ETC training course and is responsible for developing, implementing, marketing, and submitting the ECRP plans.

The notification procedures are modified to reduce the amount of forms and other publications mailed to the regulated community. Staff will continue to send courtesy notifications to employers with information on how to obtain appropriate forms and supplemental documentation. It is anticipated that this change will reduce administrative burden associated with the rule and better facilitate plan submittal.

The ECRP Guidelines provide employers with several ways to generate average vehicle ridership (AVR) credits. Rule 2202 provides for employers electing to implement an ECRP to use any of the emission reduction strategies outlined in the rule. To clarify this intent, the proposed amendments include program alternatives to facilitate employers in achieving their AVR performance target.

Summary of Proposed ECRP Guideline Amendments

- Reduce the employee transportation coordinator training time.
- Remove reference to emergency episode procedures.
- Reduce employer notifications.
- Clarify the inclusion of program alternatives to facilitate meeting AVR performance requirements.
- Periodic review and update of guidelines in consultation with rule stakeholders and the AQMD Mobile Source Committee.

IMPACT ASSESSMENT

Affected Facilities

There are approximately 1344 worksites that are subject to Rule 2202. This represents over 1.14 million worksite employees throughout the region that are affected by Rule 2202. The worksites are not concentrated in any particular business or industry. The types of worksites that are affected by the rule are summarized in Table 1. These worksites, listed according to Standard Industrial Classification (SIC) description, have the option of participating in two types of programs: emission reduction strategy or AQIP. Employers may implement an ECRP as an exemption rather than comply with the rule options. Within the Rule 2202 worksite population, participation in the emission reduction strategy, ECRP, and AQIP is approximately 22%, 57%, and 21% respectively. For the emission reduction strategy, the requirement is to achieve emission reductions for that worksite, which is determined by the number of employees reporting to work during the peak commute window time period and the employee emission reduction factor for that zone. Under the AQIP, worksites would pay a fixed amount per employee reporting to work during the peak commute window time period to a restricted fund that is used to purchase emission credits or fund projects that would achieve an equivalent amount of mobile source emission reductions. Employers participating in the AQIP will not be

affected by the proposed amendments because the AQIP fees will not be changed at this time. For the ECRP, the goal is to achieve an average vehicle ridership (AVR) 1.75, 1.5, or 1.3 for zones 1, 2 and 3 respectively.

Table 1
Employers Subject to Rule 2202

Standard Industrial Classification (SIC) Description	ERS[1]	ECRP not at target[2]	ECRP at target	AQIP	Total
Agriculture, nurseries			2		2
Food and food processing	14	8	6	11	39
Apparel	2	4	7	2	15
Furniture	5	3	2	1	11
Printing, publishing, paper	6	7	3	10	26
Chemical	5	5	4	4	18
Refinery		1	2	1	4
Plastic, foams	5	2	3	5	15
Primary manufacturing		4	2	5	11
Fabrication	16	3	3	6	28
Machinery	7	8	2	2	19
Electrical	11	27	4	13	55
Transportation Equipment	6	21	4	25	56
Instruments	7	7	0	11	25
Manufacturing	0	4	1	3	8
Transit	9		1	2	12
Transportation	11	8	2	4	25
Post Office				13	13
Communication	5	10	1	19	35
Utilities, Refuse		8	7	8	23
Non-Durable Goods	11	5	2	15	33
General Merchandise	10	60	17	29	116
National Security		5	3	1	9
Food Stores	8	1			9
Auto Dealers	3	4		4	11
Banks, securities	17	16		12	45
Insurance & Real Estate	12	30	6	3	51
Hotel	7	18	20	9	54
Businesses	7	13	2	5	27
Repair Services	4			15	19
Motion Pictures	6	8		4	18
Recreation	7	7	3	3	20
Health Care	35	85	11	13	144
Legal	2	3	3		8
Education	9	52	12	12	85
Membership Organizations	3	2	2		7
Engineering	4	3	2	1	10
Government	24	46	14	6	90
Social Services		15	6		21
Public Safety, Justice		44	13	3	60
Non-designated	18	32	10	7	67
Totals	**296**	**579**	**182**	**287**	**1344**

(1) May be affected by the proposed amendments due to emission factor changes and by the number of employers that choose to transition to AQIP
(2) Worksites that have not achieved their AVR target and will be affected by the proposed amendments.

Emission Reductions

Updating the emission factors using the EMFAC 2002 model will increase a worksite's emission reduction target, for calendar year 2004, to 19%, 42%, and 49% for VOC, NOx and CO respectively. The emission factor is a result of EMFAC model modifications that includes, for example, changes to the basin's vehicle inventory and activity, fuel reformulation, inspection and maintenance standards, base emission rates for all vehicles, and population distribution. The changes in the emission factors and the proposed amendments will result in projected annual emission reductions shown in Table 2.

Table 2
Amended Rule Emission Reductions

tons/day	2004	2006	2010
VOC	3.38	2.77	1.87
NOx	3.69	2.88	1.92
CO	35.00	29.11	20.04

The proposed rule language has an AVR performance requirement that will affect those employers that have not met their assigned AVR. Having all employers meet their assigned AVR would result in additional emission reductions in Table 3.

Table 3
Estimated Additional Emission Reductions
from AVR Performance Requirement

tons/day	2004	2006	2010
VOC	0.51	0.46	0.31
NOx	0.51	0.46	0.31
CO	5.19	4.78	3.29

Compliance Cost

The proposed amendments would increase the emission factors and thusly increase the employee ERT. The employers complying with Rule 2202 by using an emission reduction strategy will be potentially impacted in that their compliance cost may increase due to the updated rule emission factors. Employers would have the option of switching between the different rule options. However, the choice between AQIP and an emission reduction strategy would be determined by their relative cost. Worksites having additional stationary or mobile sources VOC or NOx credits, under the proposed amendments, would be allowed to use these credits to offset their CO emission reduction requirements through inter-pollutant crediting. This may affect the emission credit markets by shifting marketplace pressures to the VOC and NOx credit markets. The

resulting effects of inter-pollutant crediting on the emission market are unable to be predicted, however, if chosen, it should represent a cost-savings to employers. The estimated market cost of emission reduction credits in 2004 could be up to $9,040 per total ton. The market cost varies depending on credit availability and is probably limited by competition with the AQIP program, which is approximately $8,780 per total ton of reductions for 2004. It is anticipated that some employers may transition to AQIP if the emission credit market is deemed more expensive than AQIP. In general the emission reduction credits are often market priced to be competitive with the costs of the AQIP.

Those employers who have met their assigned AVR by implementing an ECRP will not likely be impacted by the rule amendments. Approximately 24% of Rule 2202worksites are currently implementing an ECRP. However, 76% of the worksites are not meeting their AVR targets and will be required to offset the difference between their current AVR and the required AVR with AQIP or emission reduction credits. Employers, after weighting the various cost of meeting the AVR performance requirement may transition to AQIP or an emission reduction strategy. The AQIP cost of $60 per employee is approximately $8,780 per total ton for 2004. If the AQIP option is chosen as an option to meet the AVR performance requirement the total compliance cost in 2006 for all worksites is $4,815,539 and in 2010 approximately $4,741,849. The Employers meeting their Rule 2202 requirements through the AQIP are not likely to be impacted by the rule amendments. If emission reduction strategies was chosen as an option to the AVR performance requirement the total cost will be determined by market cost, which depends on credit availability and may be limited by competition with the AQIP program.

Rule Adoption Relative to the Cost Effectiveness Schedule

On October 14, 1994, the Governing Board adopted a resolution requiring staff to consider rules being proposed for adoption in order of cost-effectiveness. The Air Quality Management Plan (AQMP) ranked, in order of cost-effectiveness, all of the proposed control measures for which costs were quantified, with the most cost-effective measures to be considered first.

The proposed amendments to Rule 2202 are to ensure consistency with CARB's regulations, clarify emission reduction credits applicable under the rule, and streamline the process of future changes to the rule by requiring only the approval of the Mobile Source Committee. Since PAR 2202 is not an AQMP control measure, consideration in order of cost-effectiveness is not required.

Incremental Cost Effectiveness

Health and Safety Code Section 40920.6 requires an incremental cost-effectiveness analysis for the proposed amendments. Incremental cost effectiveness is defined as the difference in control costs divided by the difference in emission reductions between two potential control options that can achieve the same emission reduction goal of a regulation. A more stringent control option would be to require the current Rule worksites to reduce emissions equivalent to the trips that should have occurred by the worksites with 100 to 249 employees above the 1992 AVR baseline. This would be in addition to the proposed AVR requirements.

The incremental annual emission reductions of the more stringent option would result in an additional 42,323 trip reductions and equivalent emission reductions beyond proposed amendments of 2.79, 2.59, and 1.79 total tons for 2005, 2006, and 2010 respectively. This assumes that the 100 to 249 employee worksites would be complying using the ECRP option. The cost of this alternative is $9,461 per total ton in 2005. The added program cost would be $6,892,955 in 2005.

LEGISLATIVE AUTHORITY

The California Legislature created the SCAQMD in 1977 (The Lewis-Presley Air Quality Management Act, Health and Safety Code Section 40400 et seq.) as the agency responsible for developing and enforcing air pollution control rules and regulations in the South Coast Air Basin (Basin). By statute, the SCAQMD is required to adopt an Air Quality Management Plan (AQMP) demonstrating compliance with all state and federal ambient air quality standards for the Basin [California Health and Safety Code Section 40460(a)]. Furthermore, the SCAQMD must adopt rules and regulations that carry out the AQMP [California Health and Safety Code Section 40440(a)]. The emission reductions from Rule 2202 are included in the AQMP and contribute to demonstrating compliance with state and federal ambient air quality standards. As such, the proposed Rule 2202 amendments will be consistent with the methodologies used in the AQMP.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

Pursuant to the California Environmental Quality Act (CEQA) and SCAQMD Rule 110, the SCAQMD has prepared the appropriate CEQA document to analyze any potential adverse environmental impacts associated with PAR 2202 and is attached.

COMPARATIVE ANALYSIS

Health and Safety Code section 40727.2 requires a comparison of the proposed amended rule with existing regulations imposed on the same equipment. There are no federal air pollution regulations that affect this type of operations.

DRAFT FINDINGS UNDER THE CALIFORNIA HEALTH AND SAFETY CODE

Before adopting, amending, or repealing a rule, the California Health and Safety Code requires the AQMD to adopt written findings of necessity, authority, clarity, consistency, non-duplication, and reference, as defined in Section 40727. The draft findings are as follows:

Necessity - The AQMD Governing Board has determined that a need exists to amend Rule 2202 – On-Road Motor Vehicle Mitigation Options in order to be consistent with current State and AQMP emission reductions.

Authority - The AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from the California Health and Safety Code Sections 40000, 40001, 40440, 40441, 40463, 40702, and 40725 through 40728.

Clarity - The AQMD Governing Board has determined that the proposed amendment to Rule 2202 is written or displayed so that its meaning can be easily understood by persons directly affected by it.

Consistency - The AQMD Governing Board has determined that Proposed Amended Rule 2202 is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, federal or state regulations.

Non-Duplication - The AQMD Governing Board has determined that the proposed amendment to Rule 2202 does not impose the same requirements as any existing state or federal regulations, and the proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the AQMD.

Reference - In adopting this regulation, the AQMD Governing Board references the following statutes which the AQMD hereby implements, interprets or makes specific: California Health and Safety Code Sections 40001, 40440(a), 40440(c), 40714.5, 40441.1, 39616, and the Federal Clean Air Act Section 172(c)(1)(RACT).

PUBLIC COMMENTS AND RESPONSES

This section summarizes the responses to comments received following the December 11, 2002 Stakeholder's Meeting, and the Public Workshops on February 19, 2003 and May 22, 2003.

Comment: Military installations and other federal agencies have unique security requirements that are not found at typical businesses or other local and state organizations. It was requested that some types of federal installations be exempt from the requirements of the rule.

Response: Staff considered potentially exempting all military and federal installations. The current security arrangements at these facilities do not appear to warrant a complete rule exemption. However, staff is proposing to amend Rule 2202 to include an exemption for federal field agents which allows the option of excluding them from their AVR surveys. Staff is also proposing additional language to clarify the option available to any employer to apply for a variance pursuant to Regulation V - Procedure Before the Hearing Board.

Comment: The Employee Commute Reduction Program (ECRP) Guidelines list holidays that are no longer celebrated by the typical worksite.

Response: Staff amended the holiday list to conform to current practice by employers in the AQMD.

Comment: The ECRP guidelines allow employers that have a seven day a week and a 24 hour a day operating schedule to conduct a rideshare survey during any five consecutive days. Employers, such as retailers, amusement parks, restaurants, etc, typically have a majority of their employees working a consistent schedule that includes Saturday and Sunday. It is requested that employers who operate seven days a week regardless of number of hours a day be allowed to survey over any five consecutive days of the week.

Response: Staff reviewed this request and concluded that other employers, with a seven day work schedule, having this survey flexibility could have the potential to increase the use of alternative commute modes. Staff amended the ECRP Guidelines to allow employers with a seven day a week operation the flexibility to survey any consecutive five day, provided that the majority of employees report to work during that time period.

Comment: The Rule and Implementation Guidelines include parking cash-out as one of the possible work-related trip reductions but the ECRP Guidelines do not.

Response: Staff included language in the ECRP Guidelines that include parking cash-out as one of the strategies that employers may use in implementing an ECRP.

Comment: The EMFAC emission model does not accurately reflect the vehicle fleet population for employers of 250 or more. It is likely that the regulated employers' fleets may be cleaner than what is assumed in the model.

Response: Since the vehicle fleets for employers may vary widely between the different types of worksites, industries and employer size the EMFAC model is considered to be representative of all employers. The current rule and guideline language allows employers to survey their employee fleet and determine what the emissions are for their commuting employees. This information can be used to modify the emission factors provided that there is enough information to support any change.

Comment: The proposed AVR performance requirement, for many employers, will require substantial revamping of their current ECRP and result in addition implementation cost. Request that the implementation be phased in over time.

Response: Staff agrees with this and is proposing that the effective date of the AVR performance requirement take place on January 1, 2005.

Comment: Some employers have purchased emission credits three years in advance. The increase in the emission factors may require them to purchase additional emission credits that were not planned.

Response: The rule requires employers choosing to implement an emission reduction strategy to submit a registration annually and to surrender equivalent emission reductions that meet the employer's emission reduction target. The business decision to purchase credits in advance may offer some advantage in cost and time savings. However, fluctuations to a worksite's employee population as well as changes in emission factors can necessitate the purchase of additional emission credits. The purchase of emission reductions credits over a three year period is an employer option, not a rule requirement.

Comment: Several employers and their representatives expressed their support for proposed amendments to the ECRP Guidelines. This includes the streamlined plan submittals, modification to the ETC training, and the clarification and deletion of outdated language.

Response: Comments were noted.

TECHNICAL APPENDIX

This technical appendix describes the methodology applied in the development of inter-pollutant crediting. Included are the full technical derivations for the formulas and methodologies for emission reduction factors used and defined by Rule 2202.

Inter-Pollutant Crediting

Employers subject to Rule 2202 are required to implement an emission reduction program and meet an annual ERT for VOC, NOx, and CO. Of these pollutants VOC and NOx are ozone precursors. To facilitate the AQMD's progress toward attaining the ozone standards any person may apply VOC or NOx emission credits in lieu of a worksite's CO emission reduction target. The South Coast Air Basin (SCAB) is expected to stay in compliance with the federal and state CO air quality standards. Due to anticipated vehicle turnover, the draft final 2003 AQMP projected a 6% per year reduction in CO between now and 2006, which would insure continued attainment of CO. However, the draft final 2003 AQMP also points out significant VOC and NOx reductions needed beyond current levels. Inter-pollutant crediting is designed to incentivize and expedite additional VOC and NOx reductions without compromising CO attainment status. The inter-pollutant crediting ratio is based on the total annual average on-road motor vehicle emissions inventory and the relative emission amounts assessed by pollutant. The ratio is calculated by dividing the total CO emission inventory amount by total VOC or NOx.

Using this inter-pollutant crediting a person may use VOC and/or NOx emission credits to offset all or part of the worksite's required CO emission reduction target. It is anticipated that establishing a VOC or NOx to CO offset ratio for the purposes of Rule 2202 compliance could encourage additional VOC and NOx reductions.

Inter-pollutant crediting is to be applied solely towards a worksite's CO emission reduction target. The inter-pollutant crediting would allow the use of VOC or NOx emission reduction credits in lieu of CO emission reductions at a fixed ratio as follows:

1 pound VOC = 10 pounds CO
1 pound NOx = 6 pounds CO

For example any person may apply one pound of VOC to be equivalent to ten pounds of CO. Using the inter-pollutant crediting a person may use VOC emission credits in lieu of all or part of the worksite's required CO emission reduction target.

Inter-pollutant Crediting Ratios

The annual average emission inventory is used to identify the major contributors of air contaminants and the measures required to reduce air pollution. 1997 is the base year used to project future year emissions for the draft final 2003 AQMP. The 1997 base year emissions inventory reflects adopted air regulations that are implemented as of 1997; whereas future baseline emissions inventories incorporate adopted rules with post-1997 compliance dates and the projected growth factors. The average annual inventory was developed for all criteria pollutants regardless of their attainment status.

The inter-pollutant crediting ratios were determined by evaluating the total annual average on-road motor vehicle emissions inventory as reported in Table 4 (Attachment A to Appendix III of the draft final 2003 AQMP) below. Dividing the total CO by the VOC annual average emissions for the various years reported resulted in an average ratio of 1 to 10 and a NOx to CO ratio of 1 to 6. That is to say for every 1 pound of VOC there is a corresponding 10 pounds of CO reduced. The resulting ratios are therefore based on the relative inventory amounts of VOC and NOx in comparison to CO.

Table 4
Attachment A to Appendix III - Draft Final 2003 AQMP
Annual Average Emissions by Major Source Category
Total On-Road Motor Vehicles (tons/year)

Year	VOC	NOx	CO	Ratios VOC to CO	Ratios NOx to CO
1995	623.70	899.20	6523.52	10	7
1997	533.35	841.23	5492.45	10	7
1998	490.92	815.31	5074.11	10	6
2000	399.10	740.63	4291.60	11	6
2002	336.22	671.66	3509.52	10	5
2003	313.91	636.64	3241.25	10	5
2005	267.18	570.46	2792.74	10	5
2006	254.07	549.47	2648.09	10	5
2007	240.88	518.64	2493.08	10	5
2008	228.29	488.24	2337.53	10	5
2010	198.74	419.44	2047.02	10	5
2020	118.51	184.55	1024.34	9	6
			Average	10	6

CO Emissions Foregone

Use of VOC or NOx inter-pollutant crediting for all or part of the worksite's required CO emission reduction target could potentially result in CO emissions foregone. Emissions foregone are those emission reductions that would not be achieved or would be lost as a

result of implementing the inter-pollutant crediting to meet worksites' emission reduction targets.

Rule 2202 applies to any employer who employs 250 or more employees on a full or part-time basis at a worksite. Worksites with less than 250 employees at a worksite are exempt from this rule. Approximately 1,400 worksites and 670,400 window employees are subject to the rule. The rule emission reductions result from three programs: Emission Reduction Strategies (ERS); Air Quality Investment Program (AQIP); and, the Employee Commute Reduction Program (ECRP). The ERS and AQIP are the Rule 2202 program options that could experience CO emissions foregone due to the option of inter-pollutants crediting. The two programs combined represent an estimated 43% of total worksites and 36% of window employees of the Rule 2202 regulated community.

The potential CO emissions foregone resulting from the rule amendments were estimated for years 2004, 2005, 2006, and 2010 as shown in Table 5. The emission reduction estimates are calculated using the emission factors based on EMFAC 2002 and historical ERS and AQIP participation rates. Although the South Coast Air Basin is predicted to have an employment growth, the worksite and window employee numbers are assumed to be constant using 2002 as the base year, in anticipation that a majority of the employment growth will occur at exempt worksites (less than 250 employees). It has also been observed that since the inception of Rule 2202 in 1995 till now, the number of companies with 250 or more employees has remained relatively constant.

Based on historical data, the portion of the ERS contribution to the emission reductions includes an estimate of those emissions that the participating worksite would surrender to be in compliance with the rule. Therefore, the maximum potential CO emission reductions foregone would be equal to the total anticipated VOC and NOx emission reductions from ERS and AQIP combined as shown in Table 5. The total CO emission reductions foregone represent about 0.41% of the total inventory in the respective year.

Table 5
Projected CO Emission Reduction from AQIP and ERS
(Potential CO Emission Reductions Foregone)
tons/day*

	2004	**2005**	**2006**	**2010**
CO	16.99	15.35	14.15	9.75

* Based on EMFAC 2002 Emission Factors and assuming all AQIP and ERS related CO reductions opt for VOC and NOx reductions instead.

However, the additional VOC or NOx emission reductions, incentivize by the inter-pollutant crediting, that could result are shown in Table 6.

Table 6

Potential Additional VOC and NOx Reductions
Due to Inter-Pollutant Crediting
tons/day*

	2004	**2005**	**2006**	**2010**
VOC	1.70	1.54	1.42	0.98
NOx	2.83	2.56	2.36	1.63

* Based on EMFAC 2002 Emission Factors and proposed inter-pollutant crediting ratios.

Worksite CO Emission Reductions - Example

Submitting a registration in 2004, an employer with 250 window employees at a worksite, in performance target zone 2, and using the default baseline average vehicle ridership of 1.1, would have an emission reduction target of 663, 726, and 6,984 pounds per year of VOC, NOx, and CO respectively, as shown in Table 7.

Table 7
Typical Employer - Emission Reduction Strategy
pounds/year

	Window Employees	250
Emission Reduction Target (ERT)	VOC	663
	NOx	726
	CO	6,984
Inter-pollutant Crediting to meet CO target	from VOC	698
	or	
	from NOx	1,164

Applying the inter-pollutant crediting ratios, the employer could offset the CO target by acquiring an additional 698 pounds of VOC or 1,164 pounds of NOx or a combination of either. In this example, potentially an additional 698 pounds of VOC emission reductions would be achieved and the 6,984 pounds of CO emission reductions would be foregone.

Annual Emission Factors for Daily Commute Vehicles

Emission Generation

Motor vehicles are responsible for the generation of VOC, NOx, and CO emissions. These pollutants are linked to either the combustion process of the engine or to the evaporation of the motor fuel from the storage and delivery system. These processes can be further categorized into different operating modes of the vehicle. Combustion emissions are usually higher during start-up, and are even higher during "cold" starts, since the vehicle's emission control device operates more efficiently at elevated temperatures. In addition, since the rate of evaporation increases at higher temperatures, more emissions result during the "hot soak" period following a trip. Table 8 below lists the vehicle trip generated emission sources.

Table 8: Vehicle Trip Generated Emission Sources.

VOC	NOx	CO
Start Ignition	Start Ignition	Start Ignition
Running Exhaust	Running Exhaust	Running Exhaust
Hot Soak Evaporation		
Running Losses		
Resting Losses		
Diurnal Evaporation		

EMFAC Model

AQMD relies on the California Air Resources Board (CARB) EMFAC computer model to produce emission factors which are then used as input to generate regional emissions inventories. The emissions inventories can then be categorized, for reduction quantification purposes, into a trip component, and a vehicle miles traveled (VMT) component.

Trip Component

The emission sources categorized as a trip component include the start ignition emissions, and the hot soak evaporation emissions. Emissions from these sources are therefore represented as pounds (grams) per trip.

VMT Component

The emission sources categorized as VMT components include the running exhaust, and running loss emissions. Emissions from these sources are represented as pounds (grams) per VMT.

Resting and Diurnal Evaporation

The remaining emissions are not attributed to trip reduction programs; resting and diurnal evaporation occurs at a rate independent from the vehicle's trip VMT rate.

Daily Commute Vehicle Emission Factor

Assumptions

The calculation of daily commute vehicle emission factors rely on the following assumptions:

1. CARB's EMFAC 2002 emission inventory model, version 2.2, updated April 23, 2003, was used to determine the daily commute vehicle emission factors.
2. The trip generation rate assigned to daily commute vehicles, for the purposes of Rule 2202, is 2.0 trips per daily commute vehicle.
3. The regional emission generation rates, daily trip, daily VMT, and other parameters, as determined by the EMFAC 2002 computer model, is accurate and representative for the years 2003 through 2010.
4. The average work-trip length, according to the Southern California Association of Governments (SCAG) 1999 State of the Commute, is accurate and representative, and equal to 16 miles.
5. Reactive organic gas emissions from diurnal and resting loss evaporation are constant and independent from the vehicle trip VMT rate.
6. Commuting vehicles operate primarily in cold start mode and is measured as start ignition.
7. The number of annual operating days for commutes vehicles equal to 260 days per year.
8. Commute vehicles include passenger cars and light duty trucks.
9. Trip end emissions are based on overall South Coast Air Basin Inventories.
10. Annual average inventory output was used to develop the Rule emission factors.

Methodology

Annual emissions per daily commute vehicle are therefore, for each pollutant and year:

$$\text{Emission Factor} = 2.0\ \text{TPV} \times \left[\left[\begin{array}{c}\text{Emissions per}\\ \text{Vehicle Trip}\end{array}\right] + \left[\begin{array}{c}\text{Emissions}\\ \text{per VMT}\end{array}\right] \times 16\ \text{miles/trip}\right] \times 260\ \text{dpy}$$

Where TPV = Trips per Daily Vehicle
dpy = Days per Year

Emission Factor Data

Tables 6, 7, 8, and 9 were developed based on the EMFAC model output. These values were used to derive the daily commute vehicle emission factor. The calculated emission factor represents emissions from light-duty vehicles (LDV), which are considered to be passenger cars and light duty trucks, since both are used for work commute purposes.

Table 9: VOC Mobile Source Emission Factors (LDV).

Year	Start Exhaust grams/trip	Hot Soak grams/trip	Running Exhaust grams/mile	Running Loss grams/mile
2003	1.115	0.218	0.314	0.240
2004	1.025	0.203	0.280	0.222
2005	0.935	0.187	0.247	0.205
2006	0.855	0.175	0.219	0.190
2007	0.781	0.164	0.195	0.177
2008	0.713	0.155	0.174	0.165
2009	0.650	0.147	0.155	0.155
2010	0.587	0.138	0.136	0.144

Table 10: NOx Mobile Source Emission Factors (LDV).

Year	Start Exhaust grams/trip	Running Exhaust grams/mile
2003	0.669	0.662
2004	0.631	0.593
2005	0.593	0.524
2006	0.566	0.478
2007	0.527	0.425
2008	0.495	0.385
2009	0.462	0.350
2010	0.430	0.314

Table 11: CO Mobile Source Emission Factors (LDV).

Year	Start Exhaust grams/trip	Running Exhaust grams/mile
2003	10.914	6.002
2004	10.092	5.467
2005	9.271	4.932
2006	8.654	4.540
2007	7.933	4.094
2008	7.348	3.740
2009	6.809	3.425
2010	6.270	3.109

For example, to calculate the VOC Annual Emission Factor for calendar year 2003:

Trip End Component:
= (Start Exhaust Emissions) + (Hot Soak Emissions)
= 1.115 grams/trip + 0.218 grams/trip = 1.333 grams/trip

VMT Component:
= [(Running Exhaust) + (Running Loss)] x trip length
= (0.314 grams/mile + 0.240 grams/mile) x 16 miles
= 8.864 grams/trip

VOC Annual Emission Factor:
= 2.0 trips per vehicle/day x (Trip End Component + VMT Component) x 260 days per year / 454 grams per pound
= 2.0 trips per vehicle/day x (1.333 + 8.864 grams/trip) x 260 days/year / 454 grams per pound
= 12 pounds/year per daily commute vehicle

Table 12 lists the remaining daily commute vehicle emission factors.

Table 12: Annual Emission Factors
(lbs/year/daily commute vehicle)

Emission Year	VOC	NOx	CO
2003	12	13	122
2004	11	12	112
2005	10	10	101
2006	9	9	93
2007	8	8	84
2008	7	8	77
2009	7	7	71
2010	6	6	64

Employee Emission Reduction Factors

The emission calculations in Rule 2202 were developed such that employers would determine the annual emissions resulting from work related commute trips and reductions that would be necessary to meet the pollutant attainment goals as projected in the 1994 AQMP and the draft final 2003 AQMP. In other words, based on the number of employees reporting in the peak commute window, an employer would calculate the equivalent amount of VOC, NOx, and CO that would be needed to be reduced to meet the SCAB's AVR target. The approach would give the regulated public an easy method to calculate this amount and would be quantifiable, enforceable, and realistically represents the emissions from commute vehicle trips.

A calculation method was derived where the employer would first determine the amount of emissions that are caused by the employees commuting in the peak window (emission reduction target). Then the employer would obtain emission credits, through the application of various mobile source reduction options (vehicle trip emission credits), that would be at least equal to the calculated emission reduction target. The calculations were developed to simplify and make consistent the methods for determining both the emission reduction targets and the vehicle trip emission credits.

Annual Emission Factors

The starting or initial data points for the annual emission factor table as found in Table 12, which is derived from the EMFAC model. The emission factors decrease over time which is the result of several EMFAC model inputs which may include replacement

vehicles that have decreasing emissions, changes in demographics, fuel formulations, or vehicle population size.

Employee Emission Reduction Factors

Employers determine their worksite average vehicle ridership (AVR) from the number of employees reporting in the peak commute window divided by the number of vehicles driven to the worksite. Typically employers would also determine how many additional vehicles to be reduced to actually meet the worksite's AVR target.

Section 182(d)(1)(B) of the 1987 Clean Air Act (CAA) required that non-attainment regions implement a program that would require employers of 100 or more employees to reduce work related trips and miles traveled by employees commuting to work to a level 25% above the region's baseline AVR. At that time the AVR targets were established for regions within the AQMD such that the federally mandated goals could be achieved. As a result the Performance Target Zones for regions 1, 2, and 3 are assigned AVRs 1.75, 1.5, and 1.3 respectively (a Performance Target Zone map can be found in Rule 2202 Attachment I). These were determined to be the most effective approach in achieving the emission reduction goals for the region.

The various worksite AVRs, determined through employee surveys, are the result of employer implemented trip reduction programs. The ratio of the worksite's computed AVR and the AVR target is termed the shortfall and can be used to illustrate the level of effort that would be required to achieve the worksite's AVR target. The shortfall is determined by the following equation:

$$\text{Shortfall} = 1 - \frac{\text{AVR Worksite}}{\text{AVR Target}}$$

Thus, an employer's shortfall or level of effort will vary directly with the effectiveness of a trip reduction program or employee use of alternative modes of transportation. The shortfall number can be used to determine the number of vehicles that the employer would need to reduce to achieve the worksite's AVR target. If an employer chooses not to implement a trip reduction program then it is assumed that the AVR is equal to 1.0. This effectively means that all employees are driving solo to work.

An employer, complying with Rule 2202, is not required to implement a trip reduction program. Therefore, the assumption is that employers would be starting at a worksite AVR of 1.0. From the equation above, each worksite's shortfall can then be determined. For worksites with an AVR target of 1.5 (Zone 2) the shortfall would be calculated as follows:

$$\text{Shortfall} = 1 - \frac{1.0}{1.5}$$

$$\text{Shortfall} = 0.333$$

Performing a similar calculation for AVR targets 1.75 (Zone 1) and 1.3 (Zone 3) result in shortfall values of 0.429 and 0.231, respectively. The shortfall number directly relates to the total number of commute vehicles that would need to be reduced to be in compliance with federal mandates and/or to achieve the worksite's AVR target. It is assumed that this value remains relatively constant over the year between the required reporting times.

If we assume that each employee drives alone to work then multiplying the number of employees by the shortfall value will give a value that represents the number of vehicles driven to work that need to be reduced or the number of employees that would need to seek alternatives means of transportation in order to achieve the AVR target.

$$\begin{array}{c}\text{Reductions Needed} \\ \text{to Achieve AVR Target}\end{array} = \text{Shortfall} \times \begin{array}{c}\text{Number of} \\ \text{Employee}\end{array}$$

From the annual emission factors, from the table above, each commute trip is defined as resulting in annual emissions for VOC, NOx, and CO expressed in pounds per year per daily commute vehicle. Since we assumed that each employee drives alone there is a one-to-one relationship between a commute vehicle and employee therefore, each employee is responsible for the corresponding annual emissions. From the above equation and assumptions we then calculate the amount of emissions for each pollutant that would need to be reduced per employee to reach the AVR target as follows:

$$\begin{array}{c}\text{Employee Emission Reductions} \\ \text{(pounds/year/employee)}\end{array} = \text{Shortfall} \times \begin{array}{c}\text{Annual Emissions} \\ \text{(pounds/year/daily} \\ \text{commute vehicles)}\end{array}$$

The employee emission reductions are the pounds of emissions per employee that would be required to be reduced in order to achieve the worksite's AVR target. Applying the resulting number to the total number of employees that report to work in the peak commute window would result in the following equation:

$$\begin{array}{c}\text{Emission Reduction Target} \\ \text{(pounds/year)}\end{array} = \begin{array}{c}\text{Total Number of} \\ \text{Employees in the} \\ \text{Peak Window}\end{array} \times \begin{array}{c}\text{Employee Emission} \\ \text{Reduction Factor} \\ \text{(pounds/year/employee)}\end{array}$$

The Emission Reduction Target is the total number pounds of emissions per year that the employer would need to reduce to achieve the worksite's AVR target.

Since each AVR target zone results in different shortfall values employee emission reduction factors are calculated specifically for each AVR zone and each pollutant. In

order to accommodate the terms in which the AVR targets are to be achieved (i.e., pounds of emissions per employee), the AVR target zone are redefined as Performance Target Zones. Performance Target Zones 1, 2 and 3 correspond to the AVR targets of 1.75, 1.5, and 1.3, respectively. The annual emission factors are then multiplied by the corresponding shortfall for each AVR target to develop the employee emission reduction factors as show in Tables V-1, V-2, and V-3 of the Rule 2202 Implementation Guidelines.